INDEX TO VOLUME XXII.

A.

Adams, E. P., The Absorption of Alpha-Rays in Gases and Vapors, 111.

Allen, S. J., The Velocity and the Ratio e/m for the Primary and Secondary Rays of Radium, 375.

Alloys, Thermoelectric Heterogeneity in, *E. H. Hall, L. L. Campbell, S. B. Serviss*, 246.

Alpha-Ray Activity of Radioactive Minerals, *B. B. Boltwood*, 320.

Alpha-Rays, The Absorption of, in Gases and Vapors, *E. P. Adams*, 111.

Alpha-Rays from Radium, Some Properties of, *E. Rutherford*, 123.

Alpha-Rays from Radium, Magnetic and Electrical Deflection of, *E. Rutherford*, 122.

American Physical Society. See Physical Society.

Arcing, On the Conditions for Sparking at the Break of an Inductive Circuit, *J. C. Hubbard*, 129.

Areas, On the Geometric Mean Distances of Squares and their use in the Calculation of Self- and Mutual Inductances, *E. B. Rosa*, 366.

Austin, L. W., On the Emission of Negatively Charged Particles Produced by Canal Rays, 312.

The Electrolytic Wave Detector, 364.

B.

Ballistic Galvanometer, Damping of a, *A. W. Smith*, 250.

Ballistic Work, Adjustment of the d'Arsonval Galvanometer for, *F. Wenner*, 192.

Balance, Equal Arm, *H. V. Carpenter and Zella E. Bisbee*, 31.

Barnes, H. T., Differential Temperature Records in Meteorological Work, 112.

Temperature Records of Nocturnal Radiation, 250.

Barus, Carl, Condensation Nuclei, Presidential Address, 82.

Nucleation and Ionization of Carbon Dioxide and Coal Gas, 252.

Bates, Frederick, Spectral lines as Light Sources in Polariscopic Measurements, 363.

Bauer, L. A., Cheltenham Magnetic Observatory Registration of Effects from Electric Cars over Twelve Miles Distant, 360.

Benedict, Francis Gano, A Method of Calibrating Gas Meters, 294.

Bisbee, Zella E., Equal Arm Balance, 31.

Boltwood, B. B., On the Relative Proportion of the Total Alpha-Ray Activity of Radioactive Minerals due to the Separate Constituents, 320.

Boltzman, Ludwig, *Populäre Schriften*, 255.

Boyd, Jas. E., *Differential Equations. A Short Course for Engineering Students*, 62.

Briggs, Lyman J., On the Use of Centrifugal Force in Soil Investigations, 125.

An Electrically Controlled Thermostat Operable at Room Temperature, 126.

Brooks, H. B., A New Potentiometer, 361.

Buckingham, E., Methods of Soil Hygrometry, 248.

Bucherer, Dr. A. H., *Mathematische Einführung in die Electronentheorie*, 52.

INDEX TO VOLUME XXII.

A.

Adams, E. P., The Absorption of Alpha-Rays in Gases and Vapors, 111.

Allen, S. J., The Velocity and the Ratio e/m for the Primary and Secondary Rays of Radium, 375.

Alloys, Thermoelectric Heterogeneity in, *E. H. Hall, L. L. Campbell, S. B. Serviss*, 246.

Alpha-Ray Activity of Radioactive Minerals, *B. B. Boltwood*, 320.

Alpha-Rays, The Absorption of, in Gases and Vapors, *E. P. Adams*, 111.

Alpha-Rays from Radium, Some Properties of, *E. Rutherford*, 123.

Alpha-Rays from Radium, Magnetic and Electrical Deflection of, *E. Rutherford*, 122.

American Physical Society. See Physical Society.

Arcing, On the Conditions for Sparking at the Break of an Inductive Circuit, *J. C. Hubbard*, 129.

Areas, On the Geometric Mean Distances of Squares and their use in the Calculation of Self- and Mutual Inductances, *E. B. Rosa*, 366.

Austin, L. W., On the Emission of Negatively Charged Particles Produced by Canal Rays, 312.

The Electrolytic Wave Detector, 364.

B.

Ballistic Galvanometer, Damping of a, *A. W. Smith*, 250.

Ballistic Work, Adjustment of the d'Arsonval Galvanometer for, *F. Wenner*, 192.

Balance, Equal Arm, *H. V. Carpenter and Zella E. Bisbee*, 31.

Barnes, H. T., Differential Temperature Records in Meteorological Work, 112.

Temperature Records of Nocturnal Radiation, 250.

Barus, Carl, Condensation Nuclei, Presidential Address, 82.

Nucleation and Ionization of Carbon Dioxide and Coal Gas, 252.

Bates, Frederick, Spectral lines as Light Sources in Polariscopic Measurements, 363.

Bauer, L. A., Cheltenham Magnetic Observatory Registration of Effects from Electric Cars over Twelve Miles Distant, 360.

Benedict, Francis Gano, A Method of Calibrating Gas Meters, 294.

Bisbee, Zella E., Equal Arm Balance, 31.

Boltwood, B. B., On the Relative Proportion of the Total Alpha-Ray Activity of Radioactive Minerals due to the Separate Constituents, 320.

Boltzman, Ludwig, *Populäre Schriften*, 255.

Boyd, Jas. E., *Differential Equations. A Short Course for Engineering Students*, 62.

Briggs, Lyman J., On the Use of Centrifugal Force in Soil Investigations, 125.

An Electrically Controlled Thermostat Operable at Room Temperature, 126.

Brooks, H. B., A New Potentiometer, 361.

Buckingham, E., Methods of Soil Hygrometry, 248.

Bucherer, Dr. A. H., *Mathematische Einführung in die Electronentheorie*, 52.

Burgess, G. K., On the Determination of Melting Points by Radiation Method, 359.

C.

Cady, W. G., A Machine for Compounding Sine Curves, 249.
A Self-recording Magnetic Declinometer, 249.
Calibration of Gas Meters, A Method of, *F. G. Benedict*, 249.
Campbell, L. L., Thermoelectric Heterogeneity of Certain Alloys, 246.
Canal Rays, On an Emission of Negatively Charged Particles Produced by, *L. W. Austin*, 312.
Capacity of Mica Condensers, *Anthony Zeleny*, 65.
Carbon, The Optical Properties of, *Herbert A. Clark*, 247.
Carpenter, H. V., Equal Arm Balance, 31.
Cartmel, Wm. B., The Optical Properties of Very Thin Films, 115.
Centrifugal Force, On the Use of, in Soil Investigations, *Lyman J. Briggs*, 125.
Child, C. D., Conductivity of Vapor from the Mercury Arc, 221.
Chwolson, O. D., *Lehrbuch der Physic*, 60.
Clark, Herbert A., The Optical Properties of Carbon, 247.
Coblentz, Wm. W., Infra-red Emission Spectra, 1.
Note on a New Form of Radiometer, 358.
Water of Crystallization and Water of Constitution, 368.
Coffin, J. G., On the Effect of Frequency upon the Self-inductance of Cylindrical Coils of any Number of Layers, 365.
Collins, A. Frederick, *Wireless Telegraphy, Its History, Theory and Practice*, 63.
Color Photography, Improvements in the Diffraction Process of, *Herbert E. Ives*, 339.
Condensation Nuclei, *Carl Barus*, 82.
Condensers, Mica, as Standards of Capacity, *E. B. Rosa and F. W. Grover*, 366.
Condensers, The Capacity of Mica, *Anthony Zeleny*, 65.
Conduction, The Phenomena of Ionization, in Flame Gases and Vapors, *F. L. Tufts*, 193.
Conductivities Imparted to a Flame of Illuminating Gas by Vapors of Salts of the Alkali Metals, The Relative, *F. L. Tufts*, 113.
Conductivity of the Air Due to the Sulfate of Quinine, Fanny Cook Gates, 45.
Conductivity of the Vapor from the Mercury Arc, *C. D. Childs*, 221.
Cook, S. R., on the Velocity of Sound in Gases at Low Temperatures, and the Ratio of the Specific Heats, 115.
Crystallization, Water of, and Water of Constitution, *W. W. Coblentz*, 368.
Curves, A Machine for Compounding Sine, *W. C. Cady*, 249.

D.

Dadourian, H. M., The Radioactivity of Thorium, 251.
Damping of a Ballistic Galvanometer, *A. W. Smith*, 250.
D'Arsonval Galvanometer, Some Properties of the Moving Coil Galvanometer, *Walter P. White*, 371.
Davis, Harvey N., Longitudinal Vibrations Analogous to those of a Violin String, 121.
Decay of Phosphorescence in Sidot Blende, *E. L. Nichols and Ernest Merritt*, 279.
Declinometer, A Self Recording Magnetic, *W. G. Cady*, 249.
Deflection of Alpha-Rays from Radium, Magnetic and Electric, *E. Rutherford*, 122.
Depolarizer, Electrolytic Mercurous Sulfate as, for Standard Cells, *Geo. A. Hulett*, 47.
Dersau, B. (German Transl.), *Die moderne Theorie der Physikalischen Erscheinungen*, 255.
Differential Temperature Records in

Meteorological Work, *C. H. McLeod and H. T. Barnes*, 112.
Diffraction Process in Color Photography, Improvements in, *H. E. Ives*, 339.
Dorsey, N. E., The Ratio of the Electromagnetic and Electrostatic Units, 367.

E.

Electrodynamometer, A New Determination of the E.M.F. of Clarke and Cadmium Standard Cells by the Absolute Electrodynamometer, *K. E. Guthe*, 117.
Electrolytic Mercurous Sulfate as a Depolarizer for Standard Cells, *Geo. A. Hulett*, 47.
Electrolytic Wave Detector, *L. W. Austin*, 364.
Electromagnetic and Electrostatic Units, On the Ratio of the, *E. B. Rosa and N. E. Dorsey*, 367.
E.M.F. of Clarke and Cadmium Cells by Means of an Absolute Electrodynamometer, A New Determination of, *K. E. Guthe*, 117.
Emission of Negatively Charged Particles Produced by Canal Rays, *L. W. Austin*, 312.
Equal Arm Balance, *H. V. Carpenter and Zella E. Bisbee*, 31.
Ewell, A. W., Electrical Production of Ozone (Abstract), 111.
Same (Complete paper), 232.

F.

Films, The Optical Properties of Exceedingly Thin, *W. B. Cartmel*, 115.
Fitch, Philip, On the Measurement of the Index of Refraction by the Interferometer, 345.
Fite, Wm. B., *Differential Equations, A Short Course for Engineering Students*, James E. Boyd, 62.
Flame Gases and Vapors, The Phenomena of Ionization in, *F. L. Tufts*, 193.
Freezing of Pure Liquids and Solutions Under Different Kinds of Positive and Negative Pressures, *C. S. Hudson*, 257.
Frequency, On the Effect of, upon the Self-Inductance of Cylindrical Coils of any Number of Layers, *J. G. Coffin*, 365.
Freund, Ida, *The Study of Chemical Composition*, 61.

G.

Galvanometer, Adjustment of the d'Arsonval, for Ballistic Work, *F. Wenner*, 192.
Galvanometer, Some Properties of the Moving Coil, *W. P. White*, 371.
Gas Meters, A Method of Calibrating, *F. G. Benedict*, 294.
Gases and Vapors, The Absorption of Alpha-Rays in, *E. P. Adams*, 11.
Gates, Fanny Cook, Conduction of Air Due to Sulfate of Quinine, 45.
Geer, W. C., *The Study of Chemical Composition*, Ida Freund, 61.
Geyser in Atami, Japan, K. Honda and T. Terada, 300.
Grover, F. W., Mica Condensers as Standards of Capacity, 366.
Guthe, K. E., A New Determination of the E.M.F. of Clarke and Cadmium Standard Cells by Means of an Absolute Electrodynamometer 117.

H.

Hagenbach, *Atlas of Emission Spectra*, 62.
Hall, E. H., Thermoelectric Heterogeneity in Certain Alloys, 246.
Hartman, Leon W., Concerning the Temperature of the Nernst Lamp, 351.
Honda, K., On the Geyser at Atami, Japan, 300.
Hubbard, J. C., On the Conditions for Sparking at the Break of an Inductive Circuit, 129.
Hudson, C. F., The Freezing of Pure Liquids and Solutions Under Various Kinds of Positive and Negative Pressures and the Similarity between Osmotic and Negative Pressures, 257.

Hulett, Geo. A., Electrolytic Mercurous Sulphate as a Depolarizer for Standard Cells, 47.
Mercurous Sulphate and the Standard Cells, 321.
Humphreys, W. J., An Attempt to Explain the Cause of the Pressure-shift and the Broadening of the Spectrum Lines, 127.
The Mount Weather Research Observatory, 127.
Hygrometry, Methods of Soil, *E. Buckingham*, 248.

I.

Index of Refraction by the Interferometer, Measurement of, *J. C. Shedd and Philip Fitch*, 345.
Inductance, Self-, of Cylindrical Coils of any Number of Layers, on the Effect of Frequency upon the, *J. G. Coffin*, 365.
Inductances, Self- and Mutual-, On the Geometrical Mean Distances of Square Areas and Their Use in Calculating of, *Edw. B. Rosa*, 366.
Inductive Circuit, On the Conditions for Sparking at the Break of, *J. C. Hubbard*, 129.
Infra-red Emission Spectra, *W. W. Coblentz*, 1.
Infra-Red, Polarization in the, *A. H. Pfund*, 362.
Infra-Red, Selective Absorption in the, *A. H. Pfund*, 362.
Interferometer, Measurements of the Index of Refraction by the, *J. C. Shedd and Philip Fitch*, 345.
Ionization and Nucleation of Carbon Dioxide and Coal Gas, *Carl Barus*, 252.
Ionization in Flame Gases and Vapors, The Phenomena of, *F. L. Tufts*, 193.
Ives, Herbert E., Improvements in the Diffraction Process of Color Photography, 339.

K.

King, A. S. (Transl.), *Atlas of Emission Spectra*, Hagenbach and Konen, 62.
Konen, *Atlas of Emission Spectra*, 62.

L.

Longitudinal Vibrations Analogous to those of a Violin String, *Harvey N. Davis*, 121.
Low Temperatures, on the Velocity of Sound in Gases at, and the Ratio of the Specific Heats, *S. R. Cook*, 115.
Lynde, A. J., Effect of Pressure on Surface Tension, 181.
Luminescence, Studies of. VI. The Decay of Phosphorescence in Sidot Blende, *E. L. Nichols and Ernest Merritt*, 279.

M.

Magnetic Declinometer, A Self Recording, *W. G. Cady*, 249.
Magnetic Observatory Registration of Effects of Electric Cars over Twelve Miles Distant, *L. A. Bauer*, 300.
McLeod, C. H., Differential Temperature Records in Meteorological Work, 112.
Melting Points by Radiation Method, Determination of, *C. W. Waidner and G. K. Burgess*, 359.
Mercurous Sulfate and the Standard Cells, *Geo. A. Hulett*, 321.
Murcurous Sulfate as a Depolarizer for Standard Cells, Electrolytic, *Geo. A. Hulett*, 47.
Mercury Arc, Conductivity of the Vapor from, *C. D. Child*, 221.
Merritt, Ernest, *Die Physikalischen Eigenschaften der Seen*, Otto Freiherr von und zu Aufsess, 253.
Die Kathodenstrahlen, G.C. Schmidt, 253.
Electromagnetische Schwingungen und Wellen, Josef R. von Geitler, 253.
Populäre Schriften, Ludwig Boltzman, 255.
The Decay of Phosphorescence in Sidot Blende, 279.
Wireless Telegraphy, its History,

Theory and Practice, A. Fred'k. Collins, 63.

Metals, The Relative Conductivities Imparted to a Flame of Illuminating Gas by Vapor of Salts of the Alkali, *F. L. Tufts*, 113.

Meters, A Method of Calibrating Gas, *F. G. Benedict*, 294.

Mica Condensers as Standards of Capacity, *E. B. Rosa and F. W. Grover*, 366.

Mica Condensers, The Capacity of, *Anthony Zeleney*, 65.

Mount Weather Research Observatory, The, *W. J. Humphrey*, 127.

N.

Néculcea, E. (Fr. Transl.), *La théorie moderne des phénomènes physiques; radioactivité, ions, électrons*, 266.

Negative Pressures and Osmotic Pressures, Similarity of, *C. S. Hudson*, 257.

Nernst Lamp, Concerning the Temperature of the, *L. W. Hartman*, 351.

Nichols, E. L., *Atlas of Emission Spectra*, Hagenbach and Konen, Transl. by *A. H. King*, 62.

Die Electrischen Bogenlampen, J. Zeidler, 63.

Experimentelle Untersuchung von Gasen, Morris W. Travers, 62.

Lehrbuch der Physik, O. D. Chwolson, 60.

The Decay of Phosphorescence in Sidot Blende, 279.

Nocturnal Radiation, Temperature Records of, *H. T. Barnes*, 250.

Nucleation and Ionization of Carbon Dioxide and Coal Gas, *Carl Barus*, 252.

Nuclei, Condensation, *Carl Barus*, Presidential Address, 82.

O.

Observatory, The Mount Weather Research, *W. J. Humphreys*, 127.

Optical Properties of Carbon, *H. A. Clark*, 247.

Optical Rotation, On, *Herbert M. Reese*, 265.

Osmotic and Negative Pressures, Similarity of, *C. H. Hudson*, 257.

Ozone, Electrical Production of, *A. W. Ewell*, 111, 232.

P.

Pfund, A. H., Polarization in the Infra-red, 362.

Selective Reflection in the Infra-red, 362.

Phosphorescence, Decay of in Sidot Blende, *E. L. Nichols and Ernest Merritt*, 279.

Photography, Improvements in the Diffraction Process of Color, *H. E. Ives*, 339.

Physical Society, Abstracts, 45, 111, 192, 246, 320, 358.

Minutes, 80, 245, 357.

Pierce, Geo. W., Experiments on Resonance in Wireless Telegraph Circuits, 119 and 159.

Platinum Thermoelements, On the Constancy of, and Other Thermoelement Problems, *Walter P. White*, 372.

Polariscopic Measurements, Spectral Lines as Light Sources in, *Fred'k Bates*, 363.

Polarization in the Infra-red, *A. H. Pfund*, 362.

Potentiometer, A New, *H. B. Brooks*, 361.

Pressure, Freezing of Pure Liquids and Solutions under Various Positive and Negative, *C. S. Hudson*, 257.

Pressure Shift and Broadening of Spectrum Lines, An Attempt to Explain the Cause, *W. J. Humphreys*, 127.

R.

Radiation Method for Determining Melting Points, *C. W. Waidner and G. K. Burgess*, 359.

Radioactive Minerals, On the Relative Proportion of the Total Alpha-Ray of, Due to the Separate Constituents, *B. B. Boltwood*, 312.

Radioactivity of Thorium, *H. M. Dadourian*, 251.

Radiometer, Notes on the New form of, *W. W. Coblentz*, 358.

Radium, Magnetic and Electric Deflection of the Alpha-Rays from, *E. Rutherford*, 122.

Radium, Velocity and Ratio e/m for the Primary and Secondary Rays, *S. J. Allen*, 375.

Reese, Herbert M., On Optical Radiation, 265.

Reflection in the Infra-red, Selective, *A. H. Pfund*, 362.

Resonance in Wireless Telegraphy Circuits, Experiments on, *Geo. W. Pierce*, 119 and 159.

Righi, A., *The Modern Theory of Physical Phenomena* (Fr. Transl.), 256.

Same (German Transl.), 255.

Rosa, Edward B., Mica Condensers as Standards of Capacity, 366.

On the Geometric Mean Distances of Square Areas and their Use in the Calculations of Self- and Mutual-Inductances, 366.

The Ratio of the Electromagnetic and Electrostatic Units, 367.

Rotation, On Optical, *Herbert M. Reese*, 265.

Rutherford, E., Magnetic and Electric Deflection of Alpha-Rays from Radium, 122.

Some Properties of Alpha-Rays from Radium, 123.

S.

Schmidt, G. C., *Die Kathodenstrahlen*, 253.

Searle, G. F. C., *Mathematische Einführung in die Electronentheorie*, Dr. A. H. Bucherer, 52.

Serviss, S. B., Thermoelectric Heterogeneity of Certain Alloys, 246.

Shedd, John C., On the Measurement of the Index of Refraction by the Interferometer, 345.

Sidot Blende, Decay of Phosphorescence in, *E. L. Nichols and Ernest Merritt*, 279.

Smith, A. W., Damping of a Ballistic Galvanometer, 250.

Soil Hygrometry, Methods of, *E. Buckingham*, 248.

Soil Investigations, On the Use of Centrifugal Force in, *Lyman J. Briggs*, 125.

Sound, On the Velocity of, in Gases at Low Temperatures, and the Ratio of the Specific Heats, *S. R. Cook*, 115.

Sparking at the Break of an Inductive Circuit, *J. C. Hubbard*, 129.

Specific Heats, On the Velocity of Sound in Gases at Low Temperatures and the Ratio of the, *S. R. Cook*, 115.

Spectra, Infra-red Emission, *W. W. Coblentz*, 1.

Spectral Lines as Sources of Light in Polariscopic Measurements, *Fred'k Bates*, 363.

Spectrum Lines, An Attempt to Explain the Cause of the Pressure Shift and the Broadening of, *W. J. Humphreys*, 127.

Standard Cells, A New Determination of the E.M.F. of Clark and Cadmium, by Means of an Absolute Electrodynamometer, *K. E. Guthe*, 117.

Standard Cells, Electrolytic Mercurous Sulfate as Depolarizer for, *Geo. A. Hulett*, 47.

Standard Cells, Mercurous Sulfate and, *Geo. A. Hulett*, 321.

Standards of Capacity, Mica Condensers as, *E. B. Rosa and F. W. Grover*, 366.

Studies in Luminescence, VI., The Decay of Phosphorescence in Sidot Blende, *E. L. Nichols and Ernest Merritt*, 279.

Sulfate of Quinine, Conduction of the Air Due to, *Fanny C. Gates*, 45.

Surface Tension, Effects of Pressure on, *C. J. Lynde*, 181.

T.

Temperature of the Nernst Lamp, *L. W. Hartman*, 351.

Temperature Records in Meteorological Work, Differential, *C. H. McLeod and H. T. Barnes*, 112.

Temperature Records of Nocturnal Radiation, *H. T. Barnes*, 250.

Tension, Effect of Pressure on Surface, *C. J. Lynde*, 181.

Terada, T., On the Geyser at Atami, Japan, 300.

Thermoelectric Heterogeneity of Certain Alloys, *E. H. Hall, L. L. Campbell, S. B. Serviss*, 246.

Thermoelement, On the Constancy of the Platinum, and other Thermoelement Problems, *W. P. White*, 372.

Thermostat Operable at Room Temperatures, An Electrically Controlled, *Lyman J. Briggs*, 126.

Thin Films, The Optical Properties of, *Wm. B. Cartmel*, 115.

Thorium, The Radioactivity of, *H. M. Dadourian*, 251.

Travers, Morris W., *Experimentelle Untersuchung von Gasen*, 62.

Tufts, F. L., The Phenomena of Ionization in Flame Gases and Vapors, 193.

The Relative Conductivities Imparted to the Flame of Illuminating Gas by Vapors of the Alkali Metals, 113.

U.

Units, on the Ratio of the Electromagnetic and Electrostatic, *E. B. Rosa and N. E. Dorsey*, 367.

V.

Vibrations, Longitudinal, Analogous to Those in a Violin String, *H. N. Davis*, 121.

von Geitler, Josef Ritter, *Electromagnetische Schwingungen und Wellen*, 253.

von Aufsess, Otto Freiherr, *Die Physikalischen Eigenschaften der Seen*, 253.

W

Waidner, C. W., On the Determination of Melting Points by Radiation Method, 359.

Water of Crystallization and Water of Constitution, *W. W. Coblentz*, 368.

Wave Detector, Electrolytic, *L. W. Austin*, 364.

Weather Research Observatory, The Mount, *W. J. Humphreys*, 127.

Wenner, Frank, The Adjustment of the D'Arsonval Galvanometer for Ballistic Work, 192.

White, W. P., The Constancy of Platinum Thermoelements, and Other Thermoelement Problems, 372.

Some Properties of the Moving Coil Galvanometer, 371.

Wireless Telegraph, Experiments on Resonance in Wireless Telegraph Circuits, *G. W. Pierce*, 119 and 159.

Z.

Zeidler, J., *Die Electrischen Bogenlampen*, 63.

Zeleny, Anthony, The Capacity of Mica Condensers, 65.

JAN 19 1917